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| 10/681,261 | 10/09/2003 | Takashi Nishimura | H04-3940/AI/HT | 7502 |

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| EXAMINER | |
|---|---|
| MARTINEZ, JOSEPH P | |

| ART UNIT | PAPER NUMBER |
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DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/681,261 | NISHIMURA, TAKASHI | |
| | Examiner | Art Unit | |
| | Joseph P. Martinez | 2873 | |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --***

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *28 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *27-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,28,31,40 and 44-47* is/are rejected.

7)☒ Claim(s) *29,30,32-39,41-43 and 48* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 June 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date *6-9-04*.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 27, 31, 40 and 44 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Morimoto et al. (4850686).

Re claims 27 and 40, Morimoto et al. teaches for example in fig. 1, 2 and 13, a beam-emission-angle compensating optical unit for correcting a beam emission angle, comprising: an optical element (10) formed of a light-transmissive member having a refractive index n (col. 6, ln. 29), including: a light incident surface (11) receiving an incident light beam in an incident beam direction which is defined with respect to a reference axis (y-axis); and a light emitting surface (12) emitting an output light beam in an output beam direction which is defined with respect to the reference axis (x-axis), the light incident surface and the light emitting surface forming an angle α (ω, fig. 13, col. 1, ln. 20-29) therebetween and defining an imaginary normal plane (x-z plane), which is orthogonal to both the light incident surface and the light emitting surface and which extends along the reference axis (wherein the office interprets the x-z plane to be orthogonal to each of the x-y plane and y-z plane), the output beam direction being shifted by an angle δ (α, fig. 2) from the incident beam direction, the angle δ having a value that depends on the refractive index n (n), the angle α (ω as related to θ1 and θ2), and a rotational position of the imaginary normal plane (col. 4, ln. 37-39) relative to the reference axis (fig. 2, col. 6, ln. 25-59, wherein the office interprets the equations to disclose the relation of the refractive index n, the angle α, and a rotational position of the imaginary normal plane relative to the reference axis).

Re claim 44, Morimoto et al. teaches for example in fig. 1, 2, 12 and 13, a beam-emission-angle compensating optical unit for correcting a beam emission angle, comprising: a wedge prism (50) formed of a light-transmissive member and including: a first surface receiving an incident light beam (11); and a second surface emitting an output light beam (12), the first surface and the second surface forming an apex angle α (ω, fig. 13, col. 1, ln. 20-29); and a holding unit (90, 91, 92, 93, 94) holding the wedge prism such that the wedge prism is capable of rotating about a reference axis (col. 14, ln. 10-24), the holding unit holding the wedge prism at a rotational angle about the reference axis from a reference rotational position (col. 14, ln. 10-24).

Re claim 31, Morimoto et al. further teaches for example in fig. 12, a holding unit holding the optical element rotatably about the reference axis (col. 14, ln. 10-24).

## *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 28 and 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morimoto et al. (4850686) as taught above in view of Maruyama (54615413).

Re claim 28, Morimoto et al. teaches the beam-emission-angle compensating optical unit as disclosed above, including a small apex angle (col. 1, ln. 30) and varying the apex angle $\omega$ (col. 1, ln. 27-29).

But, Morimoto et al. fails to explicitly teach the angle $\alpha$ has a value that substantially satisfies an equation $\alpha = \delta/(n-1)$.

However, within the same field of endeavor, Maruyama teaches for example, the relationship between the apex angle $\delta$, the deflecting angle $\beta$ and the refractive index can be manipulated to disclose $\delta = \beta/(nd1-nd2)$, wherein nd1 and nd2 represent variable refractive indices. Furthermore the office interprets the ability to provide nd2 = 1 to be obvious to one of ordinary skill in the art, such as the case of providing a prism filled with air. Therefore, the office interprets Maruyama to teach $\delta = \beta/(nd1-nd2)$, where nd2 = 1 and therefore discloses the claimed limitation.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Morimoto et al. in view of Maruyama in order to correct displacement of the light beams, as taught by Maruyama (col. 5, ln. 26-32).

Re claim 45, Morimoto et al. further teaches for example in fig. 2 and 12, the wedge prism includes a first wedge prism (60) and a second wedge prism (50) which are arranged along the reference axis, the first optical element receiving the incident light beam (at 11) and outputting an intermediate light beam (at 12), the second optical element receiving the intermediate light beam (at 21) and outputting the output light beam (at 22); and wherein the holding unit includes: a first holding unit holding the first wedge prism (93, 94); and a second holding unit holding the second wedge prism (90, 91, 92).

Re claim 46, Morimoto et al. further teaches for example in fig. 5, the first holding unit holds the first wedge prism (10) such that the first wedge prism can rotate (col. 8, ln. 19-21) about the reference axis (y-axis); and wherein the second holding unit holds the second wedge prism (30) such that the second wedge prism can rotate (col. 8, ln. 31-33) about the reference axis (z-axis) independently from the first wedge prism.

Re claim 47, Morimoto et al. further teaches for example in fig. 1 and 5, the first holding unit holds the first wedge prism fixedly at a predetermined rotational position (col. 2, ln. 58-60), while the second holding unit holds the second wedge prism such that the second wedge prism can rotate about the reference axis independently from the first wedge prism (col. 4, ln. 37-40).

### *Allowable Subject Matter*

Claims 29, 30, 32-39, 41-43 and 48 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art taken alone or in combination fails to anticipate or fairly suggest the limitations of the claims, in such a manner that a rejection under 35 USC 102 or 103 would be proper. The prior art fails to teach a combination of all the claimed features as presented in dependent claims 29, 30, 32, 35, 37, 41 and 48.

Specifically regarding claim 29, Morimoto et al. (4850686) teaches the state of the art of a beam-emission-angle compensating optical unit for correcting a beam emission angle.

But, Morimoto et al. fails to explicitly teach the incident beam direction being shifted from the x-axis by the angle δ, which defines an angle δyz between the y-axis and an orthogonal projection component of the incident light beam in the yz plane; and wherein the optical element is disposed with its imaginary normal plane being located at a rotational angle φ from the xy plane around the x-axis, the rotational angle φ being equal to the angle δyz to allow the light emitting surface to output the output light beam in the output beam direction that is parallel with the x axis, as claimed.

Specifically regarding claim 30, Morimoto et al. (4850686) teaches the state of the art of a beam-emission-angle compensating optical unit for correcting a beam emission angle.

But, Morimoto et al. fails to explicitly teach the incident beam direction being shifted from the x-axis by the angle δ, which defines an angle δyz between the y-axis and an orthogonal projection component of the incident light beam in the yz plane; and wherein the optical element is disposed with its imaginary normal plane being located at a rotational angle φ from the xy plane around the x-axis, the rotational angle φ being equal to the angle δyz to allow the light emitting surface to output the output light beam in the output beam direction that is parallel with the x axis; a first light incident surface and a first light emitting surface forming an angle $\alpha 1$ therebetween, the angle $\alpha 1$ having a value substantially equal to $\delta xy/(n-1)$, a second light incident surface and a second light emitting surface forming an angle $\alpha 2$ therebetween, the angle $\alpha 2$ having a value substantially equal to $\delta xz/(n-1)$, as claimed.

Specifically regarding claim 32, Morimoto et al. (4850686) teaches the state of the art of a beam-emission-angle compensating optical unit for correcting a beam emission angle.

But, Morimoto et al. fails to explicitly teach the incident beam direction being defined by an angle $\gamma 1yz$ formed between the z-axis and an orthogonal projection component of the incident light beam in the yz plane and by another angle $\gamma 1xz$ formed between the z-axis and an orthogonal projection component of the incident light beam in the xz plane; wherein the angle $\alpha$ satisfies inequalities: $-1 \leq \gamma 1yz / ((n-1)\ \alpha) \leq 1$ and $-1 \leq \gamma 1xz / ((n-1)\ \alpha) \leq 1$, wherein the holding unit orients the imaginary normal plane of the optical element to form a rotational angle $\varphi$ from the yz plane around the z-axis, wherein the light emitting surface emits the output light beam with an angle $\beta yz$ defined between the z-axis and an orthogonal projection component of the output light beam in the yz plane and an angle $\beta xz$ defined between the z-axis and another orthogonal projection component of the output light beam in the xz plane, the angles $\beta yz$ and $\beta xz$ satisfying equations: $\beta yz = (n - 1)\ \alpha * \cos\varphi - \gamma 1yz$ and $\beta xz = (n - 1)\ \alpha * \sin\varphi - \gamma 1xz$, as claimed.

Specifically regarding claim 35, Morimoto et al. (4850686) teaches the state of the art of a beam-emission-angle compensating optical unit for correcting a beam emission angle.

But, Morimoto et al. fails to explicitly teach the incident beam direction being defined by an angle $\gamma 1yz$ formed between the z-axis and an orthogonal projection component of the incident light beam in the yz plane and by another angle $\gamma 1xz$ formed between the z-axis and an orthogonal projection component of the incident light beam in the xz plane; wherein the angle $\alpha$ satisfies inequalities: $-2 \leq \gamma 1yz / ((n-1)\alpha) \leq 2$ and $-2 \leq \gamma 1xz / ((n-1)\alpha) \leq 2$, wherein the first holding unit orients the imaginary normal plane of the optical element to form a rotational angle $\varphi 1$ from the yz plane around the z-axis, wherein the second holding unit orients the imaginary normal plane of the optical element to form a rotational angle $\varphi 2$ from the yz plane around the z-axis, wherein the light emitting surface emits the output light beam with an angle $\beta yz$ defined between the z-axis and an orthogonal projection component of the output light beam in the yz plane and an angle $\beta xz$ defined between the z-axis and another orthogonal projection component of the output light beam in the xz plane, the angles $\beta yz$ and $\beta xz$ satisfying equations: $\beta yz = (n - 1)\alpha * (\cos\varphi 1 + \cos\varphi 2) - \gamma lyz$ and $\beta xz = (n - 1)\alpha * (\sin\varphi 1 + \sin\varphi 2) - \gamma 1xz$, as claimed.

Specifically regarding claim 37, Morimoto et al. (4850686) teaches the state of the art of a beam-emission-angle compensating optical unit for correcting a beam emission angle.

But, Morimoto et al. fails to explicitly teach the incident beam direction being defined by an angle $\gamma 1yz$ formed between the z-axis and an orthogonal projection component of the incident light beam in the yz plane and by another angle $\gamma 1xz$ formed between the z-axis and an orthogonal projection component of the incident light beam in the xz plane; wherein the angle $\alpha$ satisfies inequalities: $0 \leq \gamma 1yz / ((n-1)\alpha) \leq 2$ and $-1 \leq \gamma 1xz / ((n-1)\alpha) \leq 1$, wherein the first holding unit orients the imaginary normal plane of the optical element to form a rotational angle

$\varphi 1$ of a zero degree from the yz plane around the z-axis, wherein the second holding unit orients the imaginary normal plane of the optical element to form a rotational angle $\varphi 2$ from the yz plane around the z-axis, wherein the light emitting surface emits the output light beam with an angle $\beta yz$ defined between the z-axis and an orthogonal projection component of the output light beam in the yz plane and an angle $\beta xz$ defined between the z-axis and another orthogonal projection component of the output light beam in the xz plane, the angles $\beta yz$ and $\beta xz$ satisfying equations: $\beta yz = (n - 1) \alpha * (1 + \cos\varphi 2) - \gamma lyz$ and $\beta xz = (n - 1) \alpha * \sin\varphi 2 - \gamma 1xz$, as claimed.

Specifically regarding claim 41, Morimoto et al. (4850686) teaches the state of the art of a beam-emission-angle compensating optical unit for correcting a beam emission angle.

But, Morimoto et al. fails to explicitly teach the light incident surface and the light emitting surface define an imaginary normal plane, which is orthogonal to both the light incident surface and the light emitting surface and which extends along the reference axis, the incident light direction being shifted from the reference axis with an angle $\theta$, the angle $\alpha$ having a value that substantially satisfies an equation $\alpha = \theta/(n-1)$ and that allows the output beam direction to be parallel with the reference axis.

Specifically regarding claim 48, Morimoto et al. (4850686) teaches the state of the art of a beam-emission-angle compensating optical unit for correcting a beam emission angle.

But, Morimoto et al. fails to explicitly teach the angle $\alpha$ satisfies inequalities: $-2 \leq \gamma 1yz / ((n-1) \alpha) \leq 2$ and $-2 \leq \gamma 1xz / ((n-1) \alpha) \leq 2$, wherein the first holding unit orients the imaginary normal plane of the optical element to form a rotational angle $\varphi 1$ from the yz plane around the z-axis, wherein the second holding unit orients the imaginary normal plane of the optical element to form a rotational angle $\varphi 2$ from the yz plane around the z-axis, wherein the light emitting surface emits the output light beam with an angle $\beta yz$ defined between the z-axis and an orthogonal projection component of the output light beam in the yz plane and an angle $\beta xz$ defined between the z-axis and another orthogonal projection component of the output light beam in the xz plane, the angles $\beta yz$ and $\beta xz$ satisfying equations: $\beta yz = (n - 1)\ \alpha * (\cos\varphi 1 + \cos\varphi 2) - \gamma lyz$ and $\beta xz = (n - 1)\ \alpha * (\sin\varphi 1 + \sin\varphi 2) - \gamma 1xz$, as claimed.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph P. Martinez whose telephone number is 571-272-2335. The examiner can normally be reached on M-F 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
2-4-05

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